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10/714,620	11/18/2003	Gyana Ranjan Parija	00280747AA	3263

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EXAMINER	
FLEISCHER, MARK A	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/714,620	PARIJA ET AL.	
	Examiner	Art Unit	
	MARK A. FLEISCHER	3624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This final action is in reply to the amendments filed 7 November 2008.
2. Claims 1–14 have been canceled in preliminary amendments prior to the first office action.
3. Claim 15 has been added in the above mentioned preliminary amendments.
4. Claim 15 has been amended.
5. Claim 15 is currently pending and has been examined.

Response to Amendments

6. The rejection of claim 15 under 35 U.S.C. §112, 2nd paragraph is withdrawn in light of applicant's amendments.
7. The rejection of claim 15 under 35 U.S.C. §101 is maintained for the reasons set forth below.
8. The rejection of claim 15 under 35 U.S.C. §103(a) is maintained for the reasons set forth below.

Response to Arguments

9. Applicant's arguments received on 7 November 2008 have been fully considered but they are not persuasive. Referring to the previous Office action, Examiner has cited relevant portions of the references as a means to illustrate the systems as taught by the prior art. As a means of providing further clarification as to what is taught by the references used in the first Office action, Examiner has expanded the teachings for comprehensibility while maintaining the same grounds of rejection of the claims, except as noted above in the section labeled "Status of Claims." This information is intended to assist in illuminating the teachings of the references while providing evidence that establishes further support for the rejections of the claims.

10. Examiner notes that Applicant's amendments have improved and clarified important elements of the limitations such as including the qualifiers "back-to-back" in appropriate instances. In addition, although Applicant has offered some very interesting, well-reasoned and well-articulated arguments, Applicant nonetheless does not convincingly show how the various differences fail to be obvious variations of what is known in the art. Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones,* 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Furthermore, the Examiner recognizes that references cannot be arbitrarily altered or modified and that there must be some reason why one skilled in the art would be motivated to make the proposed modifications. Although the motivation or suggestion to make modifications must be articulated, it is respectfully submitted that there is no requirement that the motivation to make modifications must be expressly articulated within the references themselves. References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures, *In re Bozek,* 163 USPQ 545 (CCPA 1969). The issue of obviousness is not determined by what the references expressly state but by what they would reasonably suggest to one of ordinary skill in the art, as supported by decisions in *In re Delisle* 406 Fed 1326, 160 USPQ 806; *In re Kell, Terry and Davies* 208 USPQ 871; and *In re Fine,* 837 F.2d 1071, 1074, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988) (citing *In re Lalu,* 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)). Further, it was determined in *In re Lamberti* et al 192 USPQ 278 (CCPA) that:

(i) obvious does not require absolute predictability;

(ii) non-preferred embodiments of prior art must also be considered; and

(iii) the question is not express teaching of references but what they would suggest.

According to *In re Jacoby,* 135 USPQ 317 (CCPA 1962), the skilled artisan is presumed to know something more about the art than only what is disclosed in the applied references. Within *In re Bode,* 193 USPQ 12 (CCPA 1977), every reference relies to some extent on knowledge of persons skilled in the art to complement that which is disclosed therein. In *In re Conrad* 169 USPQ 170 (CCPA), obviousness is not based on express suggestions, but what references taken collectively would suggest.

In the instant case, the Examiner respectfully notes that each and every motivation to combine the applied references is accompanied by select portions of the respective references which specifically support that particular motivation. As such, it is NOT seen that the Examiner's combination of references is unsupported by the applied prior art of record. Rather, it is respectfully submitted that explanation based on the logic and scientific reasoning of one ordinarily skilled in the art at the time of the invention that support a holding of obviousness has been adequately provided by the motivations and reasons indicated by the Examiner, *Ex pane Levengood* 28 USPQ 2d 1300 (Bd. Pat. App. & Inter., 4/22/93).

Applicant argues that the Applicant's invention distinguishes it from the prior art because the prior art is not directed to a commercial learning services environment and further that "'general problem solving principles' is in no danger of preempting these very 'general problem solving principles'" and that "While it is true that any "process" can be expressed as an "algorithm" and equated to a "fundamental principle", this line of argument cannot sensibly be applied to the process described for the present invention which, because of the claim detail required to distinguish prior art, cannot raise a concern about preempting the application of any claim elements that - in themselves - may be among "general problem solving principles", such as stochastic analysis." (Remarks, p.6). Applicant further states that it is "false to assert that the present invention is merely an application of the earlier paper, since the earlier paper does not, in fact, undertake to study the underlying problem structure of the present invention." (Remarks, p.7).

Although Examiner appreciates this argument, it essentially conflates the issues of obviousness with that of novelty. The question is "what would an operations researcher of ordinary skill in the art" do to capture the stochastic nature in a "commercial learning services environment" given the teachings of Parija in view of Sandhu and Johnson? How would one of ordinary skill "undertake to study the underlying problem structure of the present invention?" For one thing, the distinctions between a commercial learning environment and typical university settings is increasingly blurred given that many universities provide certificate programs and even degree programs using distance learning methods for professionals and students that work full-time. Indeed, the distinctions between universities and other course delivery systems are negligible with respect to the context of scheduling issues. Moreover, the notions of time, place, sequencing and resources (instructors, classrooms, etc.) is rather universal in the timetabling arts be it in a university setting or in a commercial services learning environment and is old and well-known. Finally, the addition of certain problem structure elements, specifically the back-to-back constraints is old and well-known in the timetabling arts as shown by the cited prior art. Indeed, it is a basic element and aspect of timetabling problems to include such constraints as shown in

- Haase, et al. (*Course Planning at Lufthansa Technical Training: Constructing More Profitable Schedules*).
- Goltz, et al. (*University Timetabling Using Constraint Logic Programming*)
- Thompson, et al. (*General Cooling Schedules for a Simulated Annealing Based Timetabling System*)

Haase, et al. [p.95] where reference is made to "complex precedence, temporal, and resource-related constraints." See also Haase [p.101] "Respect temporal limitations" and "a tailored construction method that employs a serial scheduling scheme." (Note also that Haase also illustrates the timetabling problem in the context of a commercial learning environment.) See also Goltz [p.9] specifically describes the situation of sequential classes: "In this example, we assume that lecture B is scheduled after lecture A, and we consider only

the dummy courses A1 and A2 for the breaks needed after lecture A." Thus, the temporal relationships between classes, students, instructors and available resources and the constraints that devolve from them is old and well-known. Moreover, Applicant does not indicate that these constraints are processed by different, non-obvious or novel method steps.

Finally, Applicant argues that "The notion of class cancellation probability described in the present invention is very different from "the percentage of clashes of subjects" as described in Sandhu's thesis. In the present invention, the cancellation probabilities results are due to either insufficient demand realization or the unavailability of required resources (i.e. qualified instructors and other technical resources) which are very much dictated by external market conditions. In the case of Sandhu's work, the clashes among the subjects are outcomes of the algorithm used." and that, in the main, the Application is essentially "a revenue management model" that is focused on determining the right course offerings at the right time and permits cancellation of classes "at the last minute" by utilizing a "penalty clause for the registrants" (Remarks, p.7-8).

Although the reasons for a "class cancellation probability" in Sandhu may be different than the instant case, it does not diminish the fact that such aspects are obvious. Morever, such cancellation aspects and penalty costs in the context of revenue management (minimizing cost, maximizing profits, etc.) are old and well-known in the mathematical programming arts. Haase, p.98 states "Hence, a schedule should maintain a reserve of at least one instructor of each qualification group for each lesson to safeguard against absence-induced cancellations." (emphasis added) which reads on the amended language "*including a penalty cost for cancellation due to a missing classroom or a missing instructor*" and further evinces a 'revenue management model' at p. 98: "LTT wants to maximize the total profit of the schedule, that is, total sales revenue less costs." Thompson [p.348] specifically teaches use of a penalty aspect in general (and obvious terms): "This model does not include capacity restrictions or pre-orderings and we have the choice of imposing these additional constraints

on the solution space or penalising them in the cost function. We chose to impose orderings into our definition of feasible solutions, but to include desk capacities as a cost function term, as it is possible that the solution space may become disconnected if capacity constraints are tight." (emphasis added) wherein it is also noted that 'orderings' corresponds to the back-to-back constraints noted earlier. Thus, if one of ordinary skill in the art seeks to admit the possibility that there is a stochastic component to the timetabling problem such as the cancellation of classes, then it would be obvious to use that constraint set in the form of a penalty coast as indicated in the prior art in conjunction with the stochastic modeling techniques of Parija.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. §112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 15 recites the limitation "*including a penalty cost for cancellation due to a missing classroom or a missing instructor*", but it is unclear what the cancellation pertains to. Is it cancelling a course or a student's enrollment? This reflects a general problem regarding this limitation and this phrase illustrates this. The limitation of 'generating an optimization model' is very broad and illustrates the generic features of the invention. Also, how is it possible that a classroom is missing? Certainly an instructor may go missing, but a class room is either available or it is not. These aspects render the claim vague and indefinite as it does not specify the particulars regarding the model itself in terms of variables and other elements of the model formulation. For purposes of examination, Examiner interprets this as meaning that an instructor and/or classroom is unavailable.

13. Also, the limitation "and said allocated instructors for each back-to-back class is calculated …" which does not make sense in that an instructor is not something amenable to

'calculation', hence is vague and indefinite. For purposes of examination, Examiner interprets this as meaning that the allocation of instructors is calculated based on the lengths of the relevant class and available time window.

Claim Rejections - 35 USC § 101

14. 35 U.S.C. §101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

15. Claims 15 is rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a §101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780,787-88 (1876). An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a §101 statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state. Examiner notes that while the claim does recite some components of the elements of another statutory class ("computer-implemented"), it is insufficient to substantively tie them to another statutory class in that no correspondence is discernable between the various method steps and the particular components of the computer system. That is, the various steps are not tied to a particular machine or machine component. Moreover, the mere field-of-use and generic recitation of a computer implemented method in the preamble is also insufficient as the preamble, except in circumstances where it "breathes

life into the claim", is not given patentable weight. Thus, to bring a method claim within the ambit of a §101 statutory process, the machine must impose meaningful limits on the method claim's scope.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parija, *et. al* (*On Bridging the Gap Between Stochastic Integer Programming and MIP Solver Technologies*-2002) in view of Sandhu (*Automating Class Schedule Generation in the Context of a University Timetabling Information System*-2001) and further in view of Johnson (*A Database Approach to Course Timetabling*-1993).

Claims 15:

Parija, as shown, describes and/or discloses the following limitations.

- *A stochastic integer programming based constrained optimization method* (Parija, in at least the title and abstract refers generally to "stochastic integer programming". Parija, on page 4, describes the components of the constraints associated with the problem formulation) *implemented by a computer* (see Parija, p. 21 in the references for statements regarding implementation via computer code, hence 'implemented by a computer') *for allocation of classrooms and instructors to requested classes associated with cancellation probabilities, the computer performing the steps of:*

- *generating a revenue/profit optimization model of overall operational revenue/profit under the different planning scenarios by location city* (Parija on page 3 refers to "stochastic optimization modeling/solver software…" (emphasis added) hence corresponds to *generating a revenue/profit optimization model*. Note however, that, as stated above, Sandhu on page 19 refers to "maximizing profits". On page 4 Parija states: "The algorithm can be implemented within […] any commercial solver that has the necessary infrastructure for modeling a scenario tree." (emphasis added) hence corresponds to *different planning scenarios.*) *including a penalty cost* (Parija p.14) discloses use of a penalty.) *for cancellation due to a missing classroom or a missing instructor* (Parija, p. 17 states "The cost c^{s}_{0jt} denotes the penalty of failing to assign a resource to task *j*." (emphasis added) where 'penalty of failing to assign…' is equivalent to a cancellation and where a classroom and/or instructor is a resource.)*;*
- *inputting a list of classes by location city,* (Parija, on page 2 observes that "Such stochastic integer programming (SIP) problems arise, for example, in […] location [type problems…]" hence corresponds to by location city.)
- *solving a stochastic program of a revenue/profit optimization model by solving its deterministic equivalent* (Parija, on page 1 states: "In a typical setting, the uncertainty is resolved by specifying a set of scenarios and the problem is reduced to deterministic, albeit large-scale, mathematical program – known as the deterministic equivalent." (emphasis added) where the correspondence is obvious.)*;*

Parija, does not specifically teach the following limitations, but Sandhu, in an analogous art, does, as shown.

- *revenue/profit optimization model* (Sandhu on page 19 refers to "maximizing profits").
- *for allocation of classrooms* (Sandhu, on page 53 near the bottom of the page, refers to "room allocation algorithms") *and instructors* (Sandhu, on page 59 near the top of the page states: "[…] scheduled over 2000 students and instructors […]" (emphasis added) and on page 69 generally refers to "person assigned" which corresponds to

the allocation of an *instructor*) *to requested classes* (Sandhu, on page 50 states: "The students were allowed to express preferences for combinations of courses rather than for a single course." (emphasis added) hence, corresponds to *requested classes*) *associated with cancellation probabilities* (Note, see above regarding Parija and penalties. Sandhu on page 96 states: "This issue […] takes into consideration all the historical data in regards to timetable classes and generates results considering the percentage of possible clashes." (emphasis added) where the 'historical data' is used to determine 'the percentage of …clashes' hence corresponds to *cancellation* probabilities. Also, on page 84, Sandhu states: "[A] system was derived whereby solutions could be weighted […] so that the probability of a clash could be reduced." (emphasis added) where 'weighted' and 'probability of a clash' also corresponds to *cancellation probabilities.*) *and comprising the steps of:*

- *receiving input of a list of classes* (Sandhu, p.103 states "The *Subject Class Possible Room Time Lists* provides the list of all the possible rooms for teaching purposes by receiving data …") *by location city, preferred time window, their cancellation probabilities and available classrooms and instructors* (Sandhu, on page 82 refers to "a list of potential room-time slot allocations available to each entry in the teaching slot table" (emphasis added) and on page 94 describes data pertaining to "classes available", hence corresponds to *a list of classes, classrooms and instructors.* As noted above, Sandhu page 96 refers to equivalents to *cancellation probabilities.* Also, Sandhu on page 169 states: "[C]omplete data profiling [of] the overall university structure [includes] the following: Campuses – all campuses would be entered to ensure the system could support a multi campus set up" (emphasis added) where 'data profiling' corresponds to *a list of classes by location city* and the 'multi campus set up' corresponds to *location city.* Sandhu, on page 42, refers to "particular time slots […] that were requested by students." (emphasis added) hence corresponds to *preferred time windows.* Sandhu on page 96 states: "This issue […] takes into

consideration all the historical data in regards to timetable classes and generates results considering the percentage of possible clashes." (emphasis added) where the 'historical data' is used to determine 'the percentage of …clashes' hence also corresponds to *cancellation* probabilities. Also, on page 84 Sandhu states: "[A] system was derived whereby solutions could be weighted […] so that the probability of a clash could be reduced." (emphasis added) where 'weighted' and 'probability of a clash' further corresponds to *cancellation probabilities.*);

- *analyzing operational revenue/profit under different planning scenarios involving chaining of various classes, prerequisite relationships, and inter-class spacing requirements* (Sandhu on page 19 refers to "the objective of meeting a desired goal such as maximizing profits […]" (emphasis added) corresponding to *analyzing operational revenue/profit* and on page 10 states: "[I]n practical terms the timetabling problem can be described as scheduling a sequence of lectures between teachers and students in a prefixed time period […] satisfying a set of varying constraints [ ]" (emphasis added) where the 'sequence' corresponds to *chaining of various classes* and the 'varying constraints' corresponds to the *prerequisite relationships, and inter-class spacing requirements.*); *and*
- *outputting a list of classes scheduled by curriculum identification (ID), corresponding start date, allocated classrooms, location city, allocated instructor, and expected revenue* (Sandhu, on page 81 notes: "The outputs of the system are the various management and timetabling reports." (emphasis added) where these reports correspond to *expected revenue*. Sandhu on page 172 further notes "…all combinations of classes to rooms was generated, counted and checked…" and describes outputs of (page 98) "room availabilities", "room teaching usage", "subject class timetable" and "*Staff* as they are allocated rooms" and which correspond to the *classroom, curriculum identification* and *instructor,* respectively. Finally, Sandhu on page 169 states: "[A]ll campuses would be entered to ensure the system could

support a multi-campus set up." (emphasis added) hence corresponds to *location city*.)

- *wherein said start date for each class is calculated based on lengths of each class and available time windows for each class* (Sandhu notes on page 15 that "[t]he availability of sessional lecturers … can provide an extra complexity to the timetable problem even after it has been generated." (emphasis added) where the emphasized text corresponds to *available time windows for each class* since the term 'sessional…' clearly pertains to a 'class' time slot or *time window*.)
- *wherein said allocated instructors for each class is calculated based on the available instructors with required skills during the allowable time windows for each class* (Sandhu on page 10 states: "Thus, in practical terms the timetabling problem can be described as scheduling a sequence of lectures between teachers and students in a prefixed time period […] satisfying a set of varying constraints." (emphasis added) where the 'satisfying constraints' corresponds to *instructors with required skills…* Also, on page 10, Sandhu refers to "a timetable generation system that generates valid solutions […]" (emphasis added)),
- *and said allocated instructors for each back-to-back class is calculated based on the lengths of each back-to-back class and available time windows for each back-to-back class* (see previous limitation where the 'satisfying constraints' also corresponds to the lengths of each back-to-back class.)

Parija, *et. al* describes a general modeling approach, *Stochastic Integer Programming*, which is amenable for application to a vast array of problem domains, including that of *timetabling,* the subject of Sandhu's dissertation and the domain of the instant application. Moreover, as the instant Application involves probabilistic elements such as the stochastic demand for classes and class cancellation probabilities, the application of SIP to these types of timetabling problems specifically addresses these uncertainties. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Parija and Sandhu

because the SIP methodology of Parija, with the definition of appropriate constraints and problem definition of Sandhu, can lead to solutions to difficult timetabling problems and is one of many "apparently effective timetable solution generation algorithms" (Sandhu, abstract). Thus, the technical ability existed to improve solutions to such timetabling problems and would have been predictable.

Neither Parija nor Sandhu specifically describe and/or disclose the following limitation, but Johnson, as shown does.

- *and said start date for each class this is a back-to-back class is calculated based on lengths of each back-to-back class and available time windows for each back-to-back class* (Johnson, on page 427 states: "Not all classes last the same amount of time. […] In many situations, all classes are some multiple of the basic period, but in some cases, classes of a totally different time might have to be incorporated." (emphasis added) where 'incorporating' different time lengths corresponds to affecting the timetable, hence the *valid start dates*. Johnson further states that "Realistically, we can usually assume that there are enough teaching rooms available in total to accommodate all groups of students, but there will inevitably be problems caused by the use of specialist rooms such as laboratories or workshops." (emphasis added) where an 'available room' *ipso facto* corresponds to an *available time window*. Finally, on page 428 Johnson notes: "In addition to the actual timetables, a variety of lists and forms can be prepared for such things as: room allocations; subject teaching requirements; staff workloads; facility utilization; provided that the relevant data is captured and stored in an appropriate form." (emphasis added) where the 'timetables' specifically denotes the *valid start dates* and 'lists' corresponds to *the list*. Note, however that Sandhu shows on page 10: "[I]n practical terms the timetabling problem can be described as scheduling a sequence of lectures between teachers and students in a prefixed time period […] satisfying a set of varying constraints [ ]" (emphasis added) where the 'sequence' corresponds to *back-to-back class* and 'varying constraints' corresponds to *lengths of each class*).

- *wherein said allocated classrooms for each class is calculated based on tier codes for each class and available classrooms during the allowable time windows for each class* (Johnson, on page 427 refers to "a much more varied range of subject choices at both the BCSE and 'A' level." (emphasis added) and on page 432 further distinguishes "undergraduate level" which equate to *tier codes*. In addition, on page 429, Johnson states: "it is often necessary to use codes or initials to refer to individuals, courses or locations." (emphasis added) and goes on to describe "distinct groups of students" attending a "common course" and thus these groups denoted by codes ultimately affect the timetable.)
- *and said allocated classrooms for each back-to-back class is calculated based on lengths of each back-to-back class and available time windows for each back-to-back class* (Note, see above regarding the 'back-to-back' constraint. Johnson, on page 427 states: "Not all classes last the same amount of time. […] In many situations, all classes are some multiple of the basic period, but in some cases, classes of a totally different time might have to be incorporated." (emphasis added) where 'incorporating' different time lengths corresponds to affecting the timetable, hence the *valid start dates*. Johnson further states that "Realistically, we can usually assume that there are enough teaching rooms available in total to accommodate all groups of students, but there will inevitably be problems caused by the use of specialist rooms such as laboratories or workshops." (emphasis added) where an 'available room' *ipso facto* corresponds to an *available time window*. Finally, on page 428 Johnson notes: "In addition to the actual timetables, a variety of lists and forms can be prepared for such things as: room allocations; subject teaching requirements; staff workloads; facility utilization; provided that the relevant data is captured and stored in an appropriate form." (emphasis added) where the 'timetables' specifically denotes the *valid start dates* and 'lists' corresponds to *the list*.),
- *and said allocated classrooms for each back-to-back class is calculated based on lengths of each class and available time windows for each class* (Johnson, on page 427 states: "Not all classes last the same amount of time. […] In many situations, all classes are some multiple

of the basic period, but in some cases, classes of a totally different time might have to be incorporated." (emphasis added) where 'incorporating' different time lengths corresponds to affecting the timetable, hence the *valid start dates*. Johnson further states that "Realistically, we can usually assume that there are enough teaching rooms available in total to accommodate all groups of students, but there will inevitably be problems caused by the use of specialist rooms such as laboratories or workshops." (emphasis added) where an 'available room' *ipso facto* corresponds to an *available time window*. Finally, on page 428 Johnson notes: "In addition to the actual timetables, a variety of lists and forms can be prepared for such things as: room allocations; subject teaching requirements; staff workloads; facility utilization; provided that the relevant data is captured and stored in an appropriate form." (emphasis added) where the 'timetables' specifically denotes the *valid start dates* and 'lists' corresponds to *the list*. Sandhu however shows on page 10 states: "[I]n practical terms the timetabling problem can be described as scheduling a sequence of lectures between teachers and students in a prefixed time period [...] satisfying a set of varying constraints [ ]" (emphasis added) where the 'sequence' corresponds to *back-to-back class* and 'varying constraints' corresponds to *lengths of each class*).

The details articulated in Johnson merely illustrate some of a wide variety of possible and typical constraints and data that are relevant to timetabling problem definitions and solutions such as, for example, the inclusion of possible *back-to-back classes*. Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to combine the teachings of Parija/Sandhu with those of Johnson and incorporate established constraint elements into a viable system and method for solving practical, real-world timetabling problems "of a modern school or university" (Johnson, p.425), hence the technical ability existed to improve solutions to such problems and the application of SIP methods would have been predictable.

Conclusion

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925.** The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **Bradley Bayat** whose telephone number is **571.272.6704** may be contacted.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair <http://pair-direct.uspto.gov >. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to **571-273-8300**.

Hand delivered responses should be brought to the **United States Patent and Trademark Office Customer Service Window**:

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Mark A. Fleischer
/Mark A Fleischer/

Examiner, Art Unit 3624 3 February 2009

/Bradley B Bayat/

Supervisory Patent Examiner, Art Unit 3624